

PREY OF NESTING BALD EAGLES IN TEXAS

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ABSTRACT.—Food habits of nesting bald eagles (*Haliaeetus leucocephalus*) in Texas were assessed by examining prey remains collected from within and beneath nests. We collected and identified 661 prey items from 27 nesting territories. Nesting bald eagles appeared to be opportunistic feeders and their diets contained nearly equal proportions of birds (33.7%), reptiles (30.7%), and fish (30.1%); American coots (*Fulica americana*), softshell turtles (*Apalone* spp.), and freshwater catfish (*Ictalurus* spp. and *Noturus* spp.) dominated the respective food categories. The percentage of reptile remains in bald eagle diets is the highest reported in North America. Protection of traditional foraging areas is necessary to provide for an increasing bald eagle population in Texas.

KEY WORDS: *bald eagle; food habits; Haliaeetus leucocephalus; nest site; prey; Texas.*

Presas de *Haliaeetus leucocephalus* nidificantes en Texas

RESUMEN.—Hábitos alimentarios de *Haliaeetus leucocephalus* nidificantes en Texas fueron estudiados a través del exámen de restos de presas colectados en los nidos y alrededores. Colectamos e identificamos 661 categorías presas en 27 territorios de nidificación. Los individuos de *H. leucocephalus* nidificantes parecen ser oportunistas y sus dietas contienen proporciones semejantes de aves (33.7%), reptiles (30.7%) y peces (30.1%); *Fulica americana*, *Apalone* spp., y los peces *Ictalurus* spp. y *Noturus* spp., dominaron las respectivas categorías alimentarias. El porcentaje de restos de reptiles en la dieta de *H. leucocephalus* es la más alta reportada en Norteamérica. La protección de áreas tradicionales de forrajeo es necesaria para un incremento de las poblaciones de *H. leucocephalus* en Texas.

[Traducción de Ivan Lazo]

Bald eagles (*Haliaeetus leucocephalus*) take a diverse array of prey. Stalmaster (1987) reviewed 20 food habits studies and found that fish, birds, and mammals comprised 56%, 28%, and 14%, respectively, of the bald eagle's overall diet. Although bald eagle food habits are well documented in many areas of the United States and Canada (Lincer et al. 1979), no food habits data exist for bald eagles nesting in Texas. The bald eagle population in Texas is increasing, and knowledge of food habits is important to identify potential management problems, limiting factors associated with food availability, environmental contamination, and changes in land-use practices. Our objective was to determine prey species composition and percent occurrence for bald eagles nesting in Texas.

METHODS

This study was conducted in 16 of 51 counties constituting the bald eagle nesting range in Texas (Fig.1). From February through May 1985–91, food remains were collected from within and beneath nests representing 27 nesting territories. Most food debris were collected from the nest bowl; food remains were usually scarce or absent around the base of nest trees. Field methods were after Mollhagen et al. (1972), Dunstan and Harper (1975), Todd et al. (1982), and Dugoni et al. (1986), except that prey biomass was not measured. Bones, fish scales, turtle shells, feathers, and partially eaten prey were identified in the field or collected for later identification. Whole or partially eaten food items were identified in the field and returned to the nest. Blue catfish (*Ictalurus furcatus*), channel catfish (*I. punctatus*), and madtoms (*Noturus* spp.) were collectively called "catfish" due to the difficulty in accurately identifying skulls and bones when only those items

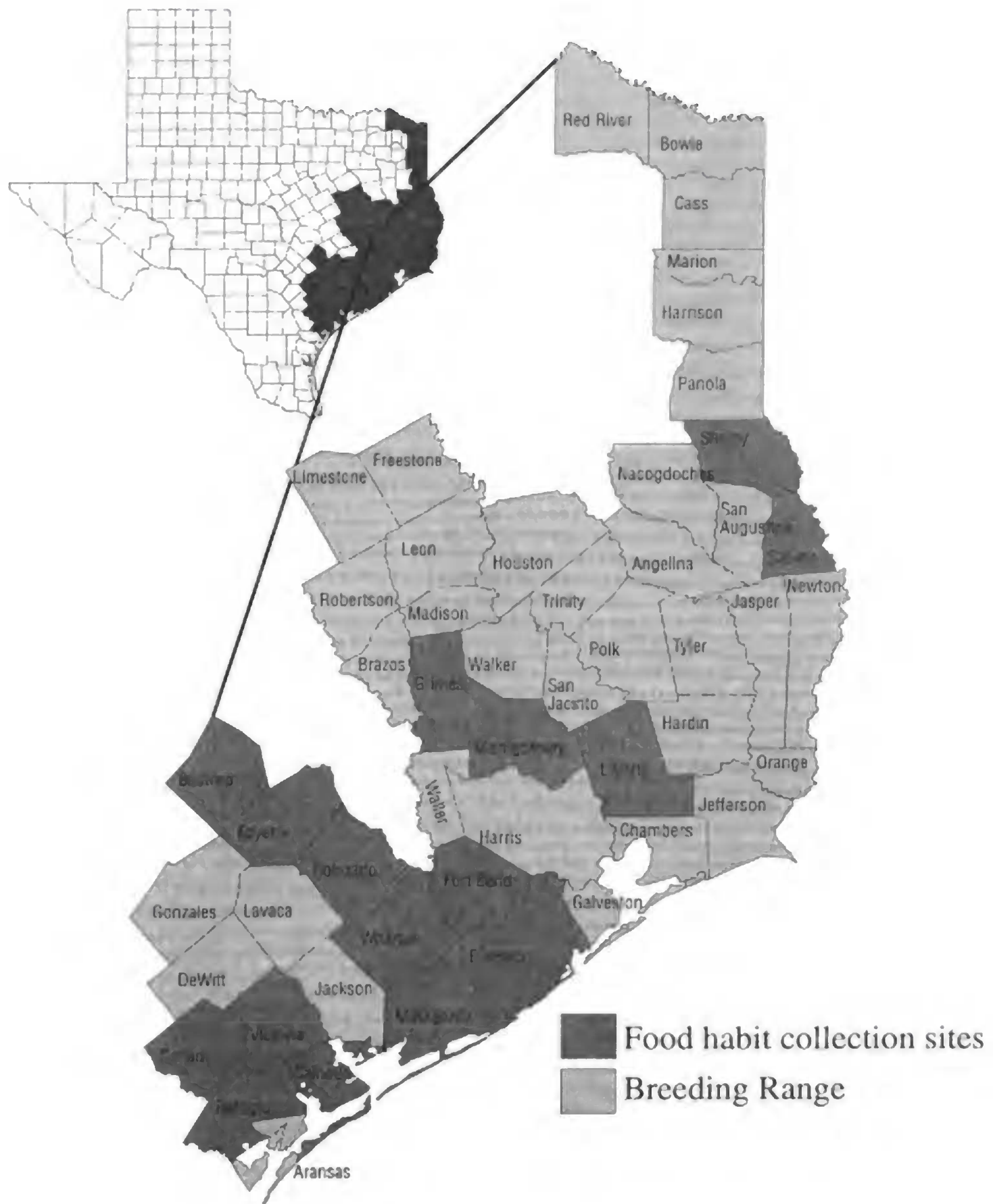


Figure 1. Breeding range of the bald eagle in Texas and counties from which food habits data were obtained.

were present. Also, we did not distinguish between eastern cottontail (*Sylvilagus floridanus*) and swamp rabbit (*S. aquaticus*) remains. All remains were identified to species or classified as either bird, mammal, fish, or reptile. Percent composition of prey was calculated as a portion of the total number of individual prey items collected from all nest sites.

RESULTS AND DISCUSSION

We identified 661 prey items representing 46 vertebrate species (Table 1). Nesting bald eagles appeared to be opportunistic feeders and their diets contained nearly equal proportions of birds (33.7%),

Table 1. Food items identified from 27 bald eagle nests in Texas, 1985-91.

| PREY | N | %N |
|--|-----|------------------|
| Birds | | |
| American coot (<i>Fulica americana</i>) | 132 | 20.0 |
| Snow goose (<i>Chen caerulescens</i>) | 26 | 3.9 |
| Northern shoveler (<i>Anas clypeata</i>) | 12 | 1.8 |
| Black-bellied whistling-duck (<i>Dendrocygna autumnalis</i>) | 10 | 1.5 |
| Cattle egret (<i>Bubulcus ibis</i>) | 7 | 1.1 |
| Blue-winged teal (<i>Anas discors</i>) | 5 | tr. ^a |
| Wood duck (<i>Aix sponsa</i>) | 4 | tr. |
| American wigeon (<i>Anas americana</i>) | 3 | tr. |
| Eastern meadowlark (<i>Sturnella magna</i>) | 3 | tr. |
| Brown-headed cowbird (<i>Molothrus ater</i>) | 3 | tr. |
| Northern pintail (<i>Anas acuta</i>) | 3 | tr. |
| Greater white-fronted goose (<i>Anser albifrons</i>) | 3 | tr. |
| American bittern (<i>Botaurus lentiginosus</i>) | 2 | tr. |
| Gadwall (<i>Anas strepera</i>) | 2 | tr. |
| Northern flicker (<i>Colaptes auratus</i>) | 1 | tr. |
| White ibis (<i>Eudocimus albus</i>) | 1 | tr. |
| Northern bobwhite (<i>Colinus virginianus</i>) | 1 | tr. |
| Redhead (<i>Aythya americana</i>) | 1 | tr. |
| Northern harrier (<i>Circus cyaneus</i>) | 1 | tr. |
| Unidentified cormorant (<i>Phalacrocorax</i> spp.) | 1 | tr. |
| Green-winged teal (<i>Anas carolinensis</i>) | 1 | tr. |
| Unidentified duck (<i>Anas</i> spp.) | 1 | tr. |
| Reptiles | | |
| Softshell turtle (<i>Apalone</i> spp.) | 182 | 27.5 |
| Mississippi map turtle (<i>Graptemys kohni</i>) | 6 | tr. |
| Razorback musk turtle (<i>Kinosternon carinatus</i>) | 6 | tr. |
| Red-eared slider (<i>Trachemys scripta</i>) | 5 | tr. |
| Common musk turtle (<i>Kinosternon odoratus</i>) | 3 | tr. |
| Ornate box turtle (<i>Terrapene ornata</i>) | 1 | tr. |
| Fish | | |
| Catfish (<i>Ictalurus</i> spp. and <i>Noturus</i> spp.) | 129 | 19.5 |
| Carp (<i>Cyprinus carpio</i>) | 40 | 6.0 |
| Crappie (<i>Pomoxis</i> spp.) | 16 | 2.4 |
| Largemouth bass (<i>Micropterus salmoides</i>) | 6 | tr. |
| Gar (<i>Lepisosteus</i> spp.) | 3 | tr. |
| Gizzard shad (<i>Polydactylus cepedianom</i>) | 3 | tr. |
| Striped bass (<i>Morone saxatilis</i>) | 1 | tr. |
| Unknown fish | 1 | tr. |
| Mammals | | |
| Eastern cottontail (<i>Sylvilagus floridanus</i>) and swamp rabbit (<i>S. aquaticus</i>) | 23 | 3.5 |
| Eastern fox squirrel (<i>Sciurus niger</i>) | 3 | tr. |
| Opossum (<i>Didelphis virginiana</i>) | 3 | tr. |
| Nine-banded armadillo (<i>Dasybus novemcinctus</i>) | 2 | tr. |
| Striped skunk (<i>Mephitis mephitis</i>) | 1 | tr. |
| Plains pocket gopher (<i>Geomys bursarius</i>) | 1 | tr. |
| Feral hog (<i>Sus scrofa</i>) | 1 | tr. |
| Hispid cotton rat (<i>Sigmodon hispidus</i>) | 1 | tr. |
| Black-tailed jackrabbit (<i>Lepus californicus</i>) | 1 | tr. |

^a tr. = <1.0%.

Table 2. Percent composition of major food items of nesting bald eagles from North America.

| LOCATION | N NESTS EXAMINED ^a | FISH | BIRDS | MAMMALS | REPTILES |
|---------------------------------------|----------------------------------|------|-------|---------|----------|
| Alaska, Aleutian Islands ^b | 28 | 6.1 | 86.0 | 7.6 | 0.0 |
| Washington ^c | 18 | 71.0 | 26.1 | 2.0 | 0.0 |
| Minnesota ^d | 6 | 90.1 | 7.9 | 1.3 | 0.0 |
| Florida ^e | 16 | 78.4 | 17.3 | 3.4 | 0.9 |
| Maine (interior) ^f | 31 | 76.7 | 16.5 | 6.8 | 0.0 |
| Maine (coastal) ^f | 45 | 17.1 | 75.7 | 6.9 | 0.0 |
| Louisiana ^g | 10 | 41.6 | 42.4 | 15.6 | 0.4 |
| Arizona ^h | 11 | 76.5 | 11.0 | 11.9 | 0.6 |
| California ⁱ | 8 | 87.0 | 9.0 | 4.0 | 0.0 |
| Nova Scotia ^j | 76 | 65.0 | 24.0 | 11.0 | 0.0 |
| Montana ^k | — | 28.0 | 55.0 | 17.0 | 0.0 |

^a In all studies, prey remains were collected from within or beneath nests. Hunt et al. (1992) also conducted some direct observations of eagles returning to nests with prey in California.

^b Murie (1940).

^c Watson et al. (1991).

^d Dunstan and Harper (1975).

^e McEwan and Hirth (1980).

^f Todd et al. (1982).

^g Dugoni et al. (1986).

^h Haywood and Ohmart (1986).

ⁱ Hunt et al. (1992).

^j Cash et al. (1985).

^k Swenson et al. (1986:31-35).

reptiles (30.7%), and fish (30.1%); mammals comprised 5.5% of prey remains. Our objective was to assess prey species composition and percent occurrence by number, and we did not quantify biomass of the various prey. Given the preponderance of smaller prey items in the diet of nesting bald eagles in Texas, it is doubtful if estimates of biomass would change the rank importance of prey classes (e.g., bird, reptile, fish, mammal) in the diet (McEwan and Hirth 1980, Haywood and Ohmart 1986, Hunt et al. 1992).

Bird Prey. Bird remains were found in 92% of the nests. Twenty-one species of birds were found with American coots (*Fulica americana*) being most common (Table 1). American coots were also the most abundant bird species in bald eagle diets in Florida (McEwan and Hirth 1980), Louisiana (Dugoni et al. 1986), and Arizona (Haywood and Ohmart 1986). Snow geese (*Chen caerulescens*), northern shoveler (*Anas clypeata*), and black-bellied whistling-ducks (*Dendrocygna autumnalis*) were the most common waterfowl species taken (Table 1). Bald eagles were commonly observed feeding on crippled or diseased geese and ducks in rice fields in the study area. Throughout the bald eagle's nesting range, birds comprise significant portions of the diet when such species are abundant (Table 2).

Reptile Prey. The proportion of reptiles in our results is the highest reported for bald eagles in

North America. Studies across the bald eagle's range indicate that reptiles comprise <1% of the diet (Table 2). Reptile remains were found in 41% of nests visited. Six species of turtles were found with soft-shell turtles (*Apalone* spp.) being most common (Table 1). Many nests contained >10 softshell turtle shells and two nests contained >20 shells. Turtle shells were consistently found in nests that were associated with the Colorado, Brazos, and Trinity rivers. Haywood and Ohmart (1986) indicated that some physical characteristics of a river (e.g., sandbars, riffles, etc.) exposed benthic feeding fish (i.e., catfish) to the surface, thus making them more vulnerable to aerial predation. This may also hold true for softshell turtles which bask or forage (Leviton 1972) in shallow water or on sandbars (Garrett and Barker 1987).

Fish Prey. Fish remains were found in 83% of the nests visited. Seven species of fish were found with freshwater catfish and carp (*Cyprinus carpio*) being most common (Table 1). Our results are consistent with other studies in that catfish were the major fish eaten by bald eagles in the southern United States (Bent 1937, Broley 1947, McEwan and Hirth 1980, Dugoni et al. 1986, Haywood and Ohmart 1986). In contrast to our results for southern nesting bald eagles, fish comprised 78% of the diet in Florida (McEwan and Hirth 1980; Table 2).

Mammal Prey. Remains of nine mammal species

were found in 33% of nests visited with eastern cottontail and swamp rabbits being most common (Table 1). Rabbits were also common food items in Arizona (Haywood and Ohmart 1986) and Florida (McEwan and Hirth 1980). Retfalvi (1970) reported that rabbits were not observed being killed by bald eagles, but rather that bald eagles scavenged rabbit carcasses along roadsides and in fields.

Portions of larger prey items (e.g., white-tailed deer, *Odocoileus virginianus*) lacking fur or bones would be undetectable due to total digestion of the meat portion. We feel, however, that large prey items were probably a minor part of the diet of nesting bald eagles in Texas and are probably obtained opportunistically while searching for more available prey (birds, reptiles, fish). Overall, mammals are not generally a common prey item of nesting bald eagles (Table 2).

Conclusions. Food supply is critical in the establishment and maintenance of breeding bald eagle populations (Dzus and Gerrard 1993). As in other areas, nesting bald eagles in Texas appear to be opportunistic feeders; in contrast to other areas, a high percentage of reptiles were consumed. At present, food availability does not appear to be a limiting factor in the maintenance or expansion of bald eagle's nesting in Texas. The major prey of nesting bald eagles in Texas are associated with wetland habitats and these areas should be managed to prevent or minimize degradation.

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